PARSONS BRINCKERHOFF

211 North Broadway
Suite 2800
St. Louis, MO 63102
314-206-4444
Fax: 314-421-1741

DATE: January 6, 2014

TO: Eric Schroeter
State Design Engineer

FROM: Parsons Brinckerhoff on behalf of
Lee Hillner, PE
Transportation Project Manager

I do hereby certify that in accordance with the requirements of 23 CFR 635.411(a)(2), this patented or proprietary item is essential for synchronization with existing highway facilities.

Eric E. Schroeter 1/8/14
State Design Engineer

SUBJECT: MoDOT St. Louis District
I-44 ITS Expansion Project, Six Flags to west of Route 50
J6Q2039
Proprietary Items (Cisco Systems & Sensys Networks Equipment)
Public Interest Finding Request

With respect to the above mentioned project, we request approval of a finding in the public interest to use the communications network equipment manufactured by Cisco Systems and to use the Wireless Vehicle Detection System manufactured by the Sensys Networks.

This project includes the deployment of new intelligent transportation system (ITS) equipment including CCTV cameras, dynamic message signs (DMS), detectors, and an extension of the fiber backbone from east of Route 109 in St. Louis County to just west of Route 50 in Franklin County (approximately 13 miles of new fiber). This project includes the installment of new network equipment including network Layer 2 and Layer 3 switches, and SONET multiplexing equipment used to facilitate ITS device communications to the Gateway Guide system.

In addition, ITS devices not currently utilizing fiber for communications will be migrated to the new fiber. These devices will provide interstate monitoring along I-44 and I-70 in western St. Louis and Franklin counties for the St. Louis District of the Missouri Department of Transportation (MoDOT). This project also includes the installation of an in-pavement, wireless detection system for the purpose of providing travel times and vehicle count and classification data on the ramp from westbound I-44 to Allenton Rd./Six Flags Rd. Accurate travel times will be viewable to the public on a web-based graphical display. Installation of a travel time system is a part of the overall collection ability of the Sensys Networks detection probes.

CISCO NETWORK EQUIPMENT

Based on the evaluation of the current system and Cisco network equipment in place within the MoDOT central office and St. Louis District, and a consideration of the integration risks associated with using other non-Cisco products, the St. Louis District of the MoDOT respectfully requests to use the following Cisco network equipment for this project:

Cisco IE 3000 Switch
Cisco Catalyst 3750 Switch
GLC-FE-100LX-RGD
GLC-GE-100FX
Cisco ONS 15454 System Assembly – assembly includes:

- Cisco ONS-15454-SA-HD – Shelf Assembly
- Cisco ONS ML-1000-2 – Ethernet Card
- Cisco ONS- 15454-TCC2P-K9= , Timing Control Cards
- Cisco ONS- 15454-TCC2P-K9= , Timing Control Cards
- Cisco ONS-15454-MRC-4
- Cisco ONS-15454-R9.2.1SWK9= , Software package

Cisco ONS-SI-2G-L1=
Cisco ONS-SI-2G-L2=
Cisco ONS-SI-GE-SX=, Furnish and Install
Cisco ONS 15454 Power Supply – power supply includes:

- Eltek – Valere CG1S-AUN-VC, Power Shelf
- Eltek – Valere V1000A1-HE

Existing Cisco Deployment

Currently, the above referenced Cisco equipment is being utilized across the St. Louis District's ITS network to facilitate device and backhaul communications in to the Gateway Guide ITS system. On past projects, the MoDOT has provided the Cisco network equipment as part of the Commission furnished items on each contract. Throughout the system, Cisco Layer 2 switching equipment (Cisco IE 3000) is used to transport device communications to Node locations strategically located throughout the region. These node locations use Cisco Layer 3 switch equipment (Cisco 3750), as well as Cisco SONET multiplexing equipment (Cisco ONS-15454) to backhaul device communications to the Transportation Management Center (TMC) located in Chesterfield Twp, Mo. This project, J6Q2039, will be the first for the St. Louis District to have the Contractor furnish all network equipment.

Integration with Current System

To ensure continuity of the MoDOT's communication network, it is requested that Cisco network equipment be used to extend the network along I-44 and I-70. This project will include integration of new communication equipment at proposed locations shown on the plans. In addition, integration with existing backhaul equipment at Node locations 24 and 17 will be required to enable redundant communications per the MoDOT's network policy. The work for this project includes the following tasks:

- Configuring Layer 2 devices at each field cabinet.
- Configuring Layer 3 devices at proposed and existing node cabinets for backhaul of communications.
- Configuring SONET multiplexing equipment for backhaul of an OC-48 link between proposed and existing node cabinets.
- Field testing equipment post installation.

- Training staff and maintenance contractor on the use of and maintenance of equipment.
- Maintaining spare parts inventory.

Discussion of Alternatives

Research of potential alternatives indicates that other than the Cisco equipment, there is not a singular system that reasonably meets the current needs and requirements of the MoDOT's backhaul communication network. There is industry standard switching equipment that would meet specifications, but would require substantial integration with existing Cisco equipment found elsewhere in the network. This would require additional resources of staff and budget to complete the deployment and integration within a reasonable amount of time. It would also require an increase in staff training for deployment of a new vendor's product and on-going maintenance. Other vendor's products may have interoperability issues when administering protocol that may be proprietary to Cisco found elsewhere on the MoDOT's ITS network. Reconfiguring the current system to allow for a 3rd party vendor protocol to be interoperable would require a significant undertaking and is not recommended.

In conclusion, if another vendor's product is deployed on this corridor, the cost to procure, integrate, and maintain the communication equipment is expected to be significantly more than the Cisco products proposed above. Additionally, the system deployment for this project represents a small system expansion in comparison to the overall St. Louis metro area deployment.

Therefore, it is recommended that Cisco equipment be used for the expansion of the existing ITS system. Approval of this request at your earliest convenience would be appreciated. The project is scheduled for a March 2014 bid opening.

SENSYS NETWORK EQUIPMENT

Based on the evaluation of the current system and the integration risk of alternative systems, the St. Louis District of the Missouri Department of Transportation – MoDOT respectfully requests the approval of a finding in the public interest to continue to use the following Sensys Networks system for the deployment along this project corridor:

Access Point Controller Card (APCC) Module
SPP Radio & Bracket (AP240 Access Point)
APCC Accessory Isolator
APCC Enclosure P/S
Universal Mounting Bracket
F Sensor - (VSN240 Wireless Flush-Mount Sensor)

Existing Sensys Deployment

The St. Louis District of MoDOT currently operates a Sensys Networks travel time and vehicle count/classification system in their area. For system accuracy of a travel time system on the I-44 ramp at Allenton, the district needs to utilize existing software for travel time calculations. Additional

detection probes being installed along this corridor will accumulate volume, speed, and occupancy data at select locations along the exit ramp from westbound I-44 to Allenton Rd./Six Flags Rd.

The installation of a travel time system is part of the overall data collection ability of the Sensys Networks detection probes. This system consists only of detection probes, antenna receivers, and wireless radios. The antenna receivers are plugged into the MoDOT Ethernet field switches located at the nearest traffic signal or ITS device cabinet. Through this connection, the system is then tied into the MoDOT communications network and data is streamed back to the central server configuration at the St. Louis District Traffic Management Center. This server reads and accumulates the data and outputs reports and dynamic information to be displayed on a graphical overlay on a Google map in real-time for public use.

Synchronization with the Current System

The district has made a significant investment in the current travel time and vehicle count/classification system throughout the metro area deploying over 2500 detection probes along the arterial network.

This investment involves all elements of the deployment, including:

1. Configuring the system database and central software
2. Field testing and calibrating the Sensys Networks detection probes and antenna receivers
3. Training staff on the use and maintenance
4. Maintaining the spare parts inventory of equipment
5. Integrating with the Advanced Traffic Management System (ATMS) software

These above items have been coordinated and are on-going for existing intersection locations throughout the St. Louis District.

Discussion of Alternatives

Research of alternative systems indicates that other than the Sensys system, there is not a singular system which reasonably meets the current needs and requirements of the MoDOT travel time and count/classification system for the application. There is Bluetooth system technology that can provide the travel time information, but would require the deployment of a new database and integration with the ATMS software. This would require substantial additional resources of staff and budget to complete this deployment and integration. It would also require an increase in staff training for deployment and maintenance.

The Bluetooth system would not be able to provide the same detailed vehicle count/classification data, which would require additional, independent sensors and systems. An alternative system would also require the management of an additional spare parts inventory, and require additional staff training on use and maintenance of such systems.

Traditional non-intrusive side-fire microwave traffic sensors (Wavetronix and RTMS) can provide the desired count and classification data. This alternative, however, will not provide travel time

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information as needed to meet the intent of the current system. This type of sensor system would also require an additional database and integration with the ATMS software.

In conclusion, if either of the two alternative systems were deployed on this corridor, the cost to integrate and maintain the travel time, vehicle count, and vehicle classification is expected to be significantly greater than the Sensys Network deployment. It is also expected to introduce additional complexities in regards to staff maintenance and operations. Additionally, the system deployment on this corridor represents a small system expansion when compared to the overall St. Louis metro area deployment.

Therefore, expansion of the existing Wireless Vehicle Detection System manufactured by Sensys Networks is the appropriate option for this project. Approval of this request at your earliest convenience would be appreciated. This project is scheduled for a March 2014 bid opening.

Approved by:

Eric E Schroeter Date 1/8/14

Eric Schroeter, State Design Engineer

Fw: J6Q2039 I-44 ITS Project / PIF Request Letter

Garland L Hillner to: Llans E Taylor 01/07/2014 08:00 AM
Cc: James E Smith, Maria K Peters

History: This message has been replied to.

Llans,

As detailed in the letter below - a PIF is necessary for this ITS project due to the burden and additional expense the use of alternate products would create, and therefore the contract will call our for specific Cisco and Sensys equipment as essential for synchronization within our existing ITS system.

Thanks for your assistance.

Lee Hillner, P.E.
Project Manager – ITS & North Area
MoDOT – St. Louis District
Office Number (314) 453-5036

----- Forwarded by Garland L Hillner/D6/MODOT on 01/07/2014 07:53 AM -----

From: Garland L Hillner/D6/MODOT
To: Llans E Taylor/SC/MODOT@MODOT,
Cc: James E Smith/SC/MODOT@MODOT, Maria K Peters/D5/MODOT@MODOT
Date: 01/06/2014 10:56 AM
Subject: J6Q2039 I-44 ITS Project / PIF Request Letter

Llans,

Please process this PIF Request letter.

PIF - Cisco & Sensys Equipment 1-6-14.pdf PIF - Cisco & Sensys Equipment 1-6-14.docx

Thanks.

Lee Hillner, P.E.
Project Manager – ITS & North Area
MoDOT – St. Louis District
Office Number (314) 453-5036

----- Forwarded by Garland L Hillner/D6/MODOT on 01/06/2014 10:51 AM -----

From: "Taufiq, Yousuf" <Taufiq@pbworld.com>
To: "Lee.Hillner@modot.mo.gov" <Lee.Hillner@modot.mo.gov>,
Cc: "DeArmond, Dan W." <DeArmond@pbworld.com>
Date: 12/26/2013 01:40 PM
Subject: RE: J6Q2039 PIF Letter

Lee - please find attached the revised PIF letter for the project. The changes included should address your original concerns on the wording of the Cisco equipment. In addition, we've added Sensys for the Six Flags application.

Please let us know if you have any further comments at your earliest convenience.

Thanks,

Yousuf Taufiq
Manager, Michigan ITS Engineering
Parsons Brinckerhoff
500 Griswold St, Suite 2900
Detroit, MI 48226
313-202-1168 (office)
313-421-8525 (cell)
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-----Original Message-----
From: Lee.Hillner@modot.mo.gov [mailto:Lee.Hillner@modot.mo.gov]
Sent: Tuesday, December 24, 2013 2:17 PM
To: Taufiq, Yousuf
Cc: DeArmond, Dan W.
Subject: RE: J6Q2039 PIF Letter

Great - Thanks!

Happy Holidays

From: "Taufiq, Yousuf" <Taufiq@pbworld.com>
To: "Lee.Hillner@modot.mo.gov" <Lee.Hillner@modot.mo.gov>, "DeArmond, Dan W." <DeArmond@pbworld.com>,
Date: 12/24/2013 11:28 AM
Subject: RE: J6Q2039 PIF Letter

Hi Lee - I'll have the final PIF letter for your review by the end of the week.

On a side note, we're addressing internal comments for plans and JSP this week and next week, and will be on track to get you the final set before January 7th.

Have a good holiday!

Yousuf Taufiq
Manager, Michigan ITS Engineering
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-----Original Message-----
From: Lee.Hillner@modot.mo.gov [mailto:Lee.Hillner@modot.mo.gov]
Sent: Tuesday, December 24, 2013 12:20 PM

To: DeArmond, Dan W.; Taufiq, Yousuf
Subject: Fw: J6Q2039 PIF Letter

Dan/Yousuf,

As I recall, PB was making some changes to the proposed PIF letter. Is there an update? Thanks.

Lee
----- Forwarded by Garland L Hillner/D6/MODOT on 12/24/2013 11:18 AM -----

From: Garland L Hillner/D6/MODOT
To: "DeArmond, Dan W." <DeArmond@pbworld.com>, "Taufiq, Yousuf"
<Taufiq@pbworld.com>,
Date: 12/04/2013 12:47 PM
Subject: J6Q2039 PIF Letter

Dan,

I have a couple questions about the draft PIF letter, please give me a call at your convenience. Thanks.

Lee Hillner, P.E.
Project Manager - ITS & North Area
MoDOT - St. Louis District
Office Number (314) 453-5036

(See attached file: 2039 PIF - Cisco Equipment.pdf)

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PIF - Cisco & Sensys Equipment 12-26-13.docx